

In Claim 73, line 2, change "Claim 39" to - - Claim 75 - -.

In Claim 74, lines 1 and 2, delete [a degree of substitution of at least about 1.5 and].

#### REMARKS

Claims 75, 41 to 48, 50 to 74, 76 and 77 remain in the application.

Applicants attorney wishes to thank Examiner Mullis for the time and consideration given at the interview of September 10, 1996 wherein the references cited were discussed as well as proposed amendment to the claims.

Claim 75, the main claim has been amended to define the upper limit of the DS range for the starch ester to "about 2.5". Basis for this is found in the specification on page 5, lines 15 to 20. Additional claims have been amended or cancelled to correct dependency or remove redundancy.

Claims 40 to 47 and 49 to 75 were rejected under 35 USC 103 as being unpatentable over Whistler et al. in view of Lotti, Wolff et al., Lipinsky, Elion, Lay et al., Buchanan, Klug and Fordyce et al. This rejection is respectfully traversed for the following reasons.

The claims as now presented define a particular degradable composition comprising a starch ester having specified ester groups and degree of substitution (1.5 to 2.5) and a defined linear polyester which is either obtained from hydroxy-carboxylic acids with specified formula or a polyester having a specified formula and obtained from the combination of a diacid and a diol. This composition can be used to provide shaped articles which are biodegradable and have good dimensional and physical properties under varying humidity conditions.

A close review will show that the references do not teach or suggest the claimed invention.

Whistler et al. disclose amylose triacetates and their plasticization to form films. This reference is directed to and shows the advantages of amylose products as distinguished from starch and amylopectin and other branched materials. While starch does contain amylose fractions, even high amylose starch materials as used in this invention contain significant amounts in the range of 30 to 50% of amylopectin content. As stated in the two paragraphs in the left column of page 796, "whole starch, as well as its

substitution products, seems to be basically unsuitable for film or film production..." and further "the brittleness of starch acetate films is due to the third cause mentioned above, the presence of the branched amylopectin fraction". Again on page 797, left column, under Film Characteristics, it is stated that "Films of amylopectin and whole starch triacetate are weak and brittle, even after plasticization. The film of amylose triacetate, on the other hand, possesses great strength and flexibility". It is thus clear that this reference is suggesting the usefulness of amylose products as distinguished from the starch, amylopectin containing products of this invention.

It is further noted that Whistler is directed to amylose triacetates which are fully esterified products having a DS of 3.0. Thus, they are not concerned with starch and particularly starch ester products having the specified DS range of 1.5 to 2.5 as being claimed. It is further noted that plasticization of triacetate or fully esterified products such as amylose triacetate is not generally or necessarily the same for lower substituted and particularly the lower DS products in the range being claimed. Therefore, it does not follow that because a plasticizer is useful for fully esterified amylose triacetate, it will be the same for amylose and particularly starch esters of a lower substituted nature, e.g., DS of 1.5 to 2.5. Furthermore, Whistler does not suggest the combination of linear polyesters with the specified starch esters as being claimed. They do suggest plasticizers for amylose triacetate but not linear polyesters and not in combination with starch esters having the defined DS range.

Accordingly, Whistler et al. can be seen as involving completely different materials than being claimed, i.e., amylose triacetate and not starch esters with DS of 1.5 to 2.5 and plasticizers but not the linear polyesters being claimed.

The secondary references are not seen or suggested as combinable with Whistler and even if combined do not suggest the claimed invention.

Lotti et al. disclose blends of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) with cellulose esters. The esters of cellulose are high DS esters of cellulose and further there is no suggestion that lower DS starch esters may be used instead of the of the specific cellulose esters disclosed. Furthermore, use of the blended materials as shown would not suggest the use of any blends with amylose triacetate as disclosed by the

primary reference, Whistler et al. There is no suggestion of how or why to combine these references.

Wolff et al. discloses amylose triesters, i.e., fully esterified esters of DS of 3.0 (see page 1247, Column 2, first full paragraph and Table 1 which disclose DS of 3.0). While the reference does disclose mixed esters, it does not suggest the use of starch but rather amylose esters. Furthermore, it does not suggest the specific starch esters with DS of 1.5 to 2.5 being claimed and the combination with linear polyesters.

Lipinsky et al., is involved with cellulose ester polymer compositions containing a degradation promoter. This reference is strictly involved with cellulose esters and does not in any way suggest starch esters of the nature and in the compositions as claimed. Cellulose materials are more linear in nature than starch and the use of starch and the formation of products with suitable properties are not the same as when using cellulose materials.

It is further noted that Claim 58 directed to poly(6-caprolactone) is supported in the disclosure of parent application 07/957,924 filed on October 7, 1992 and, therefore, Lipinsky is not an effective reference, at least as to this claim.

Elion discloses starch acetates made from agricultural flours. These appear to be high DS starch flour acetates. However, the reference does not suggest the specific starch esters having DS of 1.5 to 2.5 and the combination with linear polyesters as claimed.

Lay et al., discloses thermoplastic polymer compositions comprising destructure starch and various synthetic thermoplastic polymers. This reference indicates the need for water or moisture in forming the destructure starch. The products of this invention do not require or desire water as in Lay et al. Furthermore, the reference does not suggest the specific starch esters and the combination with linear polyesters as being claimed.

Buchanan et al., is involved with blends of cellulose esters with various polyesters and particularly reactive monomeric plasticizers such as polyethylene glycol (PEG) as shown in Example 12, Table XV and pages 72 to 74. They are in effect disclosing the use of such reactive materials which are different than those being claimed. Furthermore, the reference does not suggest the combination of starch esters and

linear polyesters as being claimed.

Klug discloses starch esters for formation into different products. However, they are involved with products in the lower DS range. Note at bottom of Column 6 and top of Column 7 that the MS of their product should not exceed 1.5 and that of 2.0 would not be useful. It is further noted that while the term MS refers to molar substitution and is different than DS, the terms are sometimes used interchangeably as in this reference. As noted in Starch Chemistry and Technology, pp. 312-314, degree of substitution is defined as greater than or equal to DS. Accordingly, this reference is involved with lower DS starch materials and does not teach or suggest the specific esters and their combination with linear polyesters as claimed.

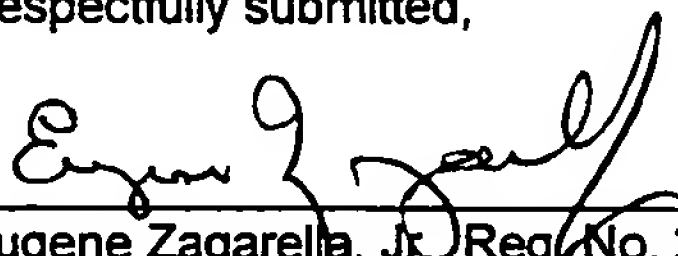
Finally, Fordyce et al. disclose cellulose acetate and ethyl toluene sulfonamide plasticizer. The reference, however, is not concerned with starch esters and particularly starch esters of DS 1.5 to 2.5 in combination with linear polyesters as claimed.

In conclusion, it is not seen that Whistler et al. taken alone or in combination with the other references teaches or suggest the specific invention of specified starch esters with DS of 1.5 to 2.5 in combination with linear polyesters as claimed.

Accordingly, in view of the above amendments and remarks, it is submitted that the claims as presented are in proper form and patentable over the references cited. Reconsideration and allowance is earnestly solicited.

Applicant gratefully acknowledges the indication of allowable subject matter in Claim 48. The disclosure of Bloembergen et al. is also acknowledged.

Respectfully submitted,

  
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